

# **Immigrants' utilization of specialist mental healthcare according to age, country of origin, and migration history – a nation-wide register study in Norway**

Dawit Shawel Abebe<sup>1</sup>, Lars Lien<sup>2, 3</sup>, Jon Ivar Elstad<sup>1</sup>

<sup>1</sup> NOVA, Oslo and Akershus University College, Oslo, Norway

<sup>2</sup> National Centre for Dual Diagnosis, Innlandet Hospital Trust, Norway

<sup>3</sup> Department of Public Health, Hedmark University College, Norway

Correspondence author:

Dawit Shawel Abebe, P.O. Box: 4 St. Olavs plass, NO-0130 Oslo, Norway

E-mail: [dawit.s.abebe@nova.hioa.no](mailto:dawit.s.abebe@nova.hioa.no)

## **Abstract**

### **Purpose**

As the immigrant population rises in Norway, it becomes ever more important to consider the responsiveness of health services to the specific needs of these immigrants. It has been questioned whether access to mental healthcare is adequate among all groups of immigrants. This study aims to examine the use of specialist mental healthcare services among ethnic Norwegians and specific immigrants groups.

### **Methods**

Register data were used from the Norwegian Patient Registry and Statistics Norway. The sample (age 0-59) consisted of 3.3 million ethnic Norwegians and 200,000 immigrants from 11 countries. Poisson regression models were applied to examine variations in the use of specialist mental healthcare during 2008-2011 according to country of origin, age group, reason for immigration, and length of stay.

### **Results**

Immigrant children and adolescents had overall significantly lower use of specialist mental healthcare than ethnic Norwegians of the same age. A distinct exception was the high utilization rate among children and youth from Iran. Among adult immigrants, utilization rates were generally lower than among ethnic Norwegians, particularly those from Poland, Somalia, Sri Lanka, and Vietnam. Adult immigrants from Iraq and Iran, however, had high utilization rates. Refugees had high utilization rates of specialist mental healthcare, while labour immigrants had low use.

### **Conclusion**

Utilization rates of specialist mental healthcare are lower among immigrants than Norwegians. Immigrants from Poland, Somalia, Sri Lanka, and Vietnam, had generally quite low rates, while immigrants from Iran had high utilization rates. The findings suggest that

specialist mental healthcare in Norway is underutilized among considerable parts of the immigrant population.

**Keywords:** Mental health care; specialist services; Immigrant; Ethnic minority; Register study

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## **Introduction**

Previous research indicates that ethnic minorities and immigrants in Western countries utilize mental healthcare services differently from that of natives, but findings vary with type of service, age, gender, country of origin, and reason for migration [1-8]. For example, a register study in Sweden found that adult refugees were more likely to be admitted to a psychiatric hospital for inpatient and compulsory care, but not for outpatient care [8]. Another large Swedish study found relatively low use of psychiatric care among adolescents with immigrant parents from low-income countries [7]. A study in the Netherlands showed that both first- and second-generation non-Western immigrants had a higher risk of contact with psychiatric emergency services than the native Dutch population [4]. Children with non-Western backgrounds in the Netherlands [3] and refugee children in Denmark [9] were, on the other hand, less likely to use psychiatric healthcare services compared to native children, whereas no differences were found between ethnic minority and native Dutch adolescents. In Norway, immigrant women are found to be less likely to consult with their general practitioner for mental health problems than non-immigrant women [10], but refugees have more mental health contacts in primary healthcare services than non-refugee immigrants from the same country [11]. A recent Danish national-register study showed that immigrants (age 18-66 years) from refugee generating countries had higher or similar rates of use of psychiatrists and psychologists than ethnic Danes, while non-Western labour immigrants had less use [12].

Mixed findings arise since immigrants' use of health services are influenced by a number of pre- and post-migration factors [13], e.g., health, reason for immigration, socio-economic status, self-perceived need, health beliefs, language barriers, cultural differences,

length of stay, and the structure and availability of health care in the “new” country [14]. The dominant tendency, however, seems to be that immigrants – at least non-refugee immigrants – use mental healthcare services less than the native populations. The reasons for this can be either limited access, or limited need for mental healthcare (or both).

Some studies have indicated that immigrants and their descendants, especially adults with refugee backgrounds, have greater risk for developing mental illness than native populations [15-17]. Lower utilization rates among immigrants may, therefore, indicate limited access to healthcare. Probable reasons could be structural, cultural, or linguistic barriers to obtaining care, for instance, lack of information about the healthcare system, low mental health literacy, culturally-rooted stigma towards visiting a psychiatrist, poor communications and a mismatch between the needs of immigrants and expectations of healthcare providers [17]. Moreover, immigrants’ pathways to psychiatric care could be difficult because of waiting lists and possibly lower probability of medical referral. This could further exacerbate relatively low utilization rates of psychiatric specialist services among immigrants which, therefore, could signify considerable unmet needs for mental health care [17].

Some studies have, however, suggested that immigrants are not necessarily at higher risk of developing mental illness. One reason could be the so-called “healthy migrant effect” [18]; i.e., migrating is so demanding, both physically and mentally, that only those with good health are able to undertake it. Thus, mental health among immigrants, both children and adults, could on average be relatively good when emigrating [19-22]. It has also been suggested that in the post-migration phase, close family ties and social capital in some immigrant communities may prevent mental health problems [23]. Accordingly, low use of mental health services among immigrants may not be due to unmet needs of healthcare, but could sometimes reflect a lower need for healthcare.

## **Aims of the study**

The above-mentioned findings highlight that research investigating use of mental healthcare services among immigrants should be specific to type of service, age groups, gender, country of origin, and reason for migration. The present study contributes to this research field in several ways. Similar to some previous studies [1,5], we focus on utilization of specialist mental healthcare, which may differ from mental healthcare provision in primary health services. In many previous studies, immigrants have been pooled into large heterogeneous categories (e.g., Western, non-Western, low-income countries or refugees), which may conceal how use of mental healthcare services differs between specific countries of origin. Furthermore, little is known about ethnic differences in the utilization of mental healthcare services in different life phases and age categories, and studies of use of mental healthcare among children and youth are few.

The present study addresses these topics by means of an investigation of utilization rates in Norwegian specialist mental healthcare among immigrants and non-immigrants. In Norway, less serious mental health problems will normally be treated by the patient's regular General Practitioner (GP). More severe cases will be referred to specialist mental healthcare services which employ both psychologists and psychiatrists (in almost equal numbers), as well as psychiatric nurses and various auxiliary personnel [24]. Those with moderate or severe mental health problems will usually be enrolled as patients in the outpatient specialist mental health services managed by the regional health authorities, either after remittance from their GPs, or after discharge from an inpatient stay. There is an institutional division between specialist mental healthcare services for adults and for children and adolescents but, for this study, both types of specialist services will be analysed together. Contacts with specialist

mental healthcare services at the outpatient level can be regarded as a good marker for the utilization of specialist mental health services in Norway.

Using register data covering all contacts with specialist mental healthcare services during 2008-2011, we examine utilization rates among ethnic Norwegians and among relatively large immigrant groups with an origin in eleven specific European and non-European countries. We explore how differences in the utilization of specialist mental healthcare vary between country of origin, age group, reason for migration, and length of residence in Norway. We hypothesize that immigrants with backgrounds from non-Western countries, especially children and recently arrived immigrants, will in general have lower use of mental healthcare than ethnic Norwegians, while refugees and those with backgrounds from refugee-generating countries will have a higher use of mental healthcare. The knowledge generated by this study will shed light on the use of specialist mental healthcare services among immigrants and non-immigrants, with different countries of origin and in different age categories. This knowledge will be of relevance to health policy as it gives information regarding possible barriers to access to specialist mental healthcare services.

## **Materials and methods**

### **Study population**

The base data file, comprising all individuals listed in the Norwegian population register per 1 January 2008 (approximately 4.7 millions), was constructed by linking socio-demographic information from Statistics Norway with data from Norwegian Patient Registry, specifically, those who made contact with specialist mental healthcare services during the period 2008-2011. The analysed sample was restricted to those aged 0-59 years since few non-Western immigrants aged 60 and more were living in Norway in 2008.

Immigrants, as defined in this paper, include both “1<sup>st</sup> generation” (born abroad by non-Norwegian parents) and “2<sup>nd</sup> generation” (born in Norway, both parents 1<sup>st</sup> generation

immigrants to Norway). In the data file, information about 11 specific countries of origin was available: Sweden, Poland, Bosnia-Herzegovina, Russia, Somalia, Turkey, Sri Lanka, Iraq, Iran, Pakistan and Vietnam. Inhabitants with a background from these 11 countries constituted nearly half (48.5%) of the entire immigrant population in Norway in 2008. As other immigrants to Norway were classified in heterogeneous categories (e.g., West Europe, Other Asia), they will not be analysed in this study.

## **Variables**

The data file provided information about registered contacts with specialist mental healthcare services during 2008-2011. The analysed outcome variable indicates how many years during the follow-up study period that the individual had contacts with specialist mental healthcare services at the outpatient level. Thus, the outcome *use of specialist mental healthcare service* varies from zero (no registered contact during 2008-2011) to four (contacts with specialist mental healthcare every year from 2008 to 2011). Mostly, these contacts were face-to-face consultations with a psychiatrist or psychologist at the outpatient level.

Gender was coded 0 for males and 1 for females. Information about age was only available in ten-years bands, due to data protection stipulations; the age variable (per 1 January 2008) had six categories: 0-9, 10-19, 20-29, 30-39, 40-49, and 50-59 years.

For a subsample amongst the immigrants, also reasons for immigration, classified as labour, family re-union, or refugee, could be examined (those who came for education were too few to be analysed). This information was only available for non-Nordic immigrants who came during 1990-2007; thus, neither 2<sup>nd</sup> generation immigrants, immigrants from Sweden, nor immigrants who came before 1990, had information on this variable. For this subsample, length of residence was measured by years of migration in four categories: migrated 1990-1995, 1996-2000, 2001-2005 and 2005-2007.



## **Statistical Analysis**

After describing the sample, age and gender standardized rates of use of specialist mental healthcare services were calculated for each country of origin. Thereafter, Poisson regression models were applied to investigate use of specialist mental healthcare during the four observation years 2008-2011, across countries of origin and separately for children (age 0-9), adolescents (age 10-19), young adults (age 20-39), and mature adults aged 40-59. These estimates were gender adjusted. Results from these adjusted regression models are presented as marginal effects (predicted probabilities with robust standard errors –  $\beta$  (se)). Marginal effects eases the interpretation of results since they report the averaged change in probability ( $P(y=1)$ ) given the distribution of other independent variables for all observations. Predicted values from these analyses inform the probability of contact with specialist mental healthcare among specific countries of origin and age groups.

In the last part of the analyses, similar Poisson regression analyses were used for examining how utilization rates in the immigrant sample differed according to reason for migration and length of stay.

A p-value ( $P$ )  $\leq 0.05$  was regarded as statistically significant. Maximum likelihood estimates with robust standard error were applied. The statistical analyses were carried out using Stata SE/14.

## **Ethics**

The research project has been approved by the Norwegian Data Protection Authority and the Norwegian Regional Committee for Medical and Health Research Ethics (REC South East). The unique personal identification number, assigned to all registered inhabitants in Norway, was used for linking data but subsequently deleted from the data file. Variables that could potentially be used for identifying individuals have either been deleted or recoded into broad categories, as stipulated by the Norwegian Data Protection Authority.

## **Results**

### **Characteristics of the study population**

Table 1 shows that in the total study sample of approximately 3.5 million, 94% were classified as ethnic Norwegians and 6% as 1<sup>st</sup> or 2<sup>nd</sup> generation immigrants with a background from the 11 countries (sample size for each country of origin is shown in Table 2). About a quarter of the immigrants were 2<sup>nd</sup> generation – among children and adolescents, this proportion was of course higher (not shown in the table). Distributions on socio-demographic variables are presented separately for ethnic Norwegians and immigrants in Table 1. The immigrants, compared to the Norwegians, had a higher proportion of adults aged 20-39 and a lower proportion of those aged 50-59. Among those with information about reason for migration, approximately 43% migrated on the grounds of family re-union, 39% were refugees, and 18% were labour immigrants. In total, about 8% of ethnic Norwegians and 7% of immigrants had contact with specialist mental healthcare at least once during the years 2008-2011; 1% of the Norwegians and 0.7% of the immigrants had contacts in all four of the observation years.

Table 1 about here

### **Utilization of specialist mental healthcare services across countries of origin and age groups**

Table 2 presents utilization rates among Norwegians and immigrants from the 11 countries origin, standardized for age and gender. The proportions (in %) who made contact at least once during 2008-2011, as well as estimated proportions who had contacts during one, two, three, or all four, of the study years, are displayed. Table 2 indicates that immigrants from both Iraq and Iran had more use of specialist mental healthcare than ethnic Norwegians. Also, immigrants from Bosnia-Herzegovina and Turkey had much use of specialist mental

healthcare, while immigrants with other countries of origin – Poland, Vietnam, Sri Lanka, and Somalia in particular – had relatively low use of specialist mental healthcare.

Marginal effects (predicted probabilities) for each country of origin in four age categories, gender-adjusted, estimated by Poisson regression models, are presented in Table 3. These predicted values indicate the probability of having contact with specialist mental healthcare among specific countries of origin and age groups. Among children (age 0-9 years), only those with an Iranian background had higher use of specialist mental healthcare than the ethnic Norwegian children. Children from all the other countries had significantly lower use, except for those from Sweden and Russia who did not differ significantly from the Norwegian children. Among the next, adolescent category (age 10-19), country variations were practically the same as among the younger children. Iranian origin corresponded to higher use; adolescents with a background from Poland, Bosnia-Herzegovina, Somalia, Turkey, Sri Lanka, Iraq, Pakistan, and Vietnam, had significantly lower use, while those with a Swedish or Russian background had utilization rates fairly similar to the ethnic Norwegian adolescents.

Country of origin variations among adults were different from patterns among children and adolescents, however. Both among young adults (age 20-39) and older adults (age 40-59), utilization rates were significantly higher for immigrants from Iraq and Iran than for ethnic Norwegians. Consistently lower utilization rates for both adult categories emerged for those with a Polish, Somali, Sri Lanka, and Vietnamese background than for Norwegians. Patterns varied for the remaining countries; for example, Swedish and Russian young adults, but not older adults, had lower use than Norwegian adults. Bosnia-Herzegovinian older adults, but not younger adults, had a quite high utilization rate, while Pakistani background went together with a significantly lower rate for young adults, but a utilization rate for older adults which did not deviate significantly from the Norwegian rate.

Predicted probabilities in Table 3 also indicate utilization levels across the life span for different countries. For ethnic Norwegians, highest and lowest rates were among adolescents and adults aged 40-59, respectively. Also among immigrants from Sweden, Poland, Russia, Somalia, and Sri Lanka, highest rates were observed for adolescents, while there was less use among the adult age categories. In contrast, among those from Bosnia-Herzegovina, Iraq, and Iran, particularly high rates occurred for those in the 40-59 age category.

Tables 2 and 3 about here

### **Utilization of specialist mental healthcare services across reasons for migration and length of stay**

Lastly, similar Poisson regression models are applied to examine differences in utilization of specialist mental healthcare across reasons for immigration and length of stay, without specifying each country of origin. Estimates were adjusted to age and gender. This analysis was restricted to the non-Nordic, 1<sup>st</sup> generation, subsample, who had arrived during 1990-2007 since information about reason for immigration was not available for other immigrant categories. Results, in terms of marginal effects (predicted probabilities), are graphically displayed in Figure 1 where the utilization level among ethnic Norwegians are also indicated. Refugee immigrants ( $\beta=0.20$ ,  $p<0.001$ ) reported significantly higher use of specialist mental healthcare than Norwegians ( $\beta=0.17$ ), while labour ( $\beta=0.03$ ) and family re-union ( $\beta=0.14$ ) migrants reported a significantly lower use of specialist mental healthcare. Recent labour and family re-union migrants (arrival years 2001-2007) had lower utilization rates of specialist mental healthcare, but family re-union migrants with a longer stay had utilization rates similar to the Norwegians. Refugees had consistently high use of specialist mental healthcare, with small differences between early refugees (i.e., arrival years 1990-1995) and more recent refugees.

Figure 1 about here

## Discussion

This study indicates that utilization of specialist mental healthcare services among immigrants in Norway varied considerably with country of origin and with age, as well as with reasons for migration and length of stay. Immigrant children and adolescents from eight of the eleven analysed countries had significantly lower use of specialist mental healthcare than Norwegians; those with a Swedish or Russian background did not deviate much from the Norwegian utilization rates, while those with an Iranian origin had particularly high utilization rates. Given that mental health problems are no less prevalent among immigrant children and youth than among ethnic Norwegians [25], the results indicate that children and adolescents from Eastern parts of Europe (except Russia) and from non-Western backgrounds (except for Iran) tend to underutilize specialist mental healthcare. This concurs, to some extent, with previous research showing underutilization of psychiatric healthcare services among non-Western immigrant children in the Netherlands [3] and refugee children in Denmark [9].

The research on the explanations for differences in the use of specialist mental healthcare between immigrant and non-immigrant children and adolescents is limited. In some immigrant milieus, strong family ties may perhaps reduce the propensity of seeking professional health care outside the family. More important is perhaps the differences in parental perceptions about mental health problems and services [26,27]. For instance, immigrant parents could have less knowledge about the mental healthcare system and the potential severity of mental health problems, more often believe that the problem can be handled without treatments, and there may be lack of trust, negative experiences with mental health providers, and more stigma related to mental illness. Such factors may contribute to the explanation of underutilization of psychiatric healthcare services among immigrant children and adolescents.

Relatively low use is common among adult immigrants, but there were many variations across country of origin. In both adult age categories, immigrants from Poland, Somalia, Sri Lanka, and Vietnam had consistently low utilization rates, while immigrants from Iraq, and from Iran in particular, had higher use than ethnic Norwegians. More varied utilization patterns appeared for the remaining five countries, but adults from Sweden, Russia, and Pakistan tended towards lower use, while adults from Bosnia-Herzegovina and Turkey tended towards higher use than Norwegian adults.

The predominant pattern, therefore, is that immigrants in Norway had lower utilization rates of specialist mental healthcare than ethnic Norwegians. This corresponds to findings in previous Norwegian studies that mental health problems are less often raised by immigrants in consultations with GPs [10]. The data available for this study cannot examine whether better mental health is some of the reason for the observed tendency, but it seems likely that underutilization occurs, in the sense that mental health problems that would normally trigger specialist mental healthcare for ethnic Norwegians, do not lead to specialist mental healthcare for many immigrants. Various types of barriers could be involved. Since co-payments are low, it is less probable that costs are the most important explanation. As to the low rates for Polish immigrants, both geographical proximity, language difficulties, and widespread opinions that the Polish healthcare system is better [28], may lead these immigrants towards seeking care in their home country. Low rates among Somalis could also be due to language barriers, but also to the stigma associated with mental illness. In addition, widely held beliefs that spirits are the cause of mental illness imply that help will be sought from traditional healers or religious leaders, rather than from the Norwegian health services [29].

Several findings are difficult to explain, however, for example why immigrants with a background from Sri Lanka, Pakistan, and Vietnam have overall rather low use, while Iranian immigrants have high utilization rates in all analysed age categories. A considerable

proportion of these immigrants have lived in Norway for many years, and many of them are well-integrated in Norwegian society. Previous studies have, nevertheless, indicated that adult immigrants from these countries report higher prevalence of mental distress [30], and when their utilization rates are low, underutilization may be indicated.

Country of origin is, however, only one of the main determinants of utilization of mental healthcare services. Our study reveals that refugees have generally a slightly higher use of specialist mental healthcare, and immigrants from some (eg., Iraq, Iran), but not all (eg., Somalia), refugee-generating countries have relatively frequent contacts. Similar results have emerged in previous Nordic studies [8,12]. Labour migrants, however, had lower use of specialist mental healthcare than Norwegians, regardless of their length of stay, which could partly be explained by the “healthy migrant effect”.

### **Strengths and Limitations**

The special contribution of the present study is that it has addressed use of specialist mental healthcare among immigrants, using high-quality nation-wide register data that cover the entire population; i.e., selection bias is practically absent. The Norwegian Patient Registry provides information from the great majority of specialist mental healthcare providers and institutions in Norway. Although a limited number of private psychologists and psychiatrists, and a few small private hospitals, do not report their consultations to the Registry, the estimated utilization rates are probably quite precise. Another strength of the present study is that the register data enable analyses of immigrants with specific countries of origin, in contrast to many previous studies that have had to pool many countries into heterogeneous categories. A third strength is the focus on ethnic variations in four different age categories, indicating how utilization rates differ according to life phases.

The study, however, has various limitations. Only registered inhabitants, and not undocumented immigrants or new asylum seekers who have not yet been granted residence permit, are in the analysed samples, implying that some particularly vulnerable immigrants could not be analysed here. Considerable missing information about reasons of migration could be a source for bias and potentially affect the generalizability of findings. Since reason for migration was not registered until 1990, this study cannot, for example, indicate whether the distress and traumas which led to high use of mental healthcare among refugees, tend to “wear out” after living for two decades or more in the new country. A weakness of the present study, affecting practically all studies based on administrative registers, is that the paucity of information found in such registers restricts the possibility for testing detailed explanations. Further research with data suitable for exploring underlying mechanisms is needed in this field.

## **Conclusion**

This study has revealed a complex pattern of variations in utilization of specialist mental healthcare services in Norway according to country of origin, age, and reason for immigration. Among children and adolescents in the immigrant population with a background from Eastern European countries (except for Russia) and from non-Western countries (except Iran), utilization rates were significantly lower than among ethnic Norwegians in the same age categories. Children and youth from Poland, Somalia, Sri Lanka, Pakistan, and Vietnam had particularly low utilization rates in specialist mental healthcare, whilst those from Iran had particularly high use. Among adults, deviations from the level among ethnic Norwegians were less distinct but, generally, adult immigrants from most of the 11 studied countries had lower utilization rates – adults from Iraq and from Iran in particular were striking exceptions as their utilization rates were comparatively high. In addition, refugees had generally high utilization rates in specialist mental healthcare. The findings suggest that immigrants’ underutilization of



psychiatric and psychologist services could be a problem in Norwegian mental healthcare. Policy-makers and service providers should try to implement measures which improve the responsiveness of mental healthcare services to the needs of different ethnic groups and ultimately might lead to higher utilization rates among immigrants. One such measure is to implement the Cultural Formulation Interview from the Diagnostic and Statistical Manual of Mental Disorders V that enables therapist to improve their skills in making culturally-sensitive approaches to patients.

### **Competing interests**

The authors declare having no competing interests.

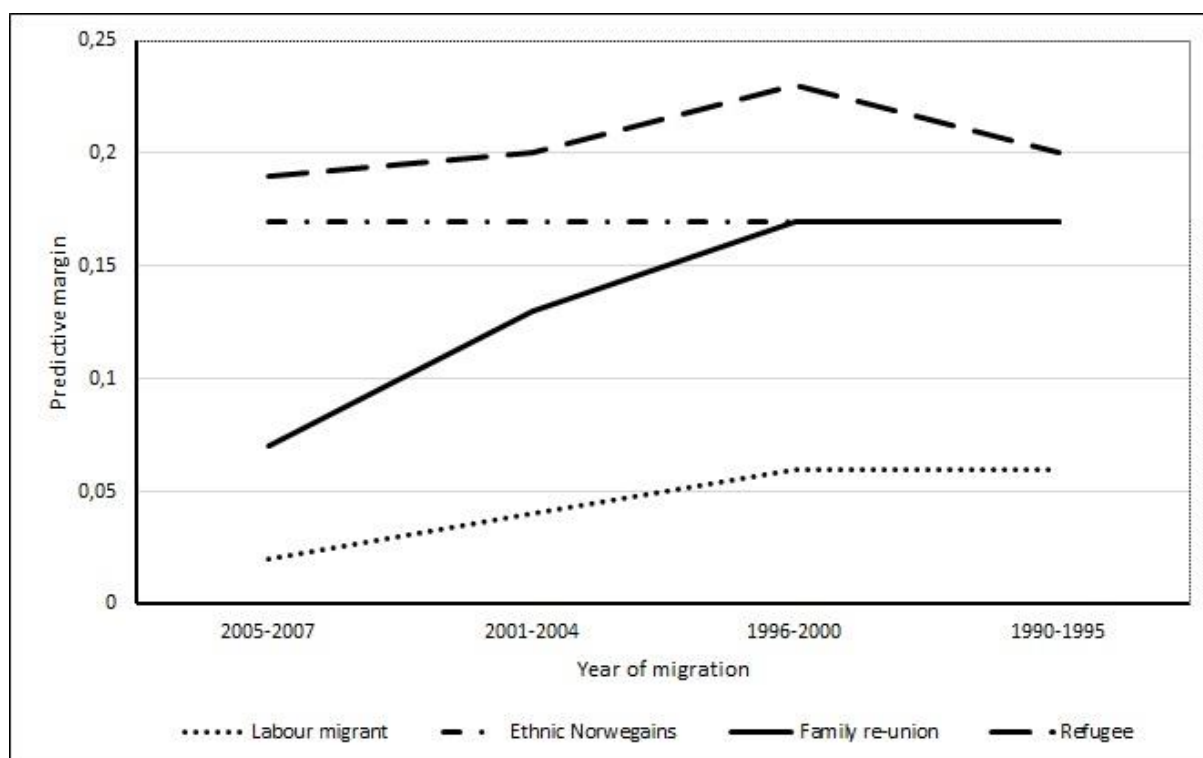
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**Figure 1 Predicted probabilities for the use of specialist mental healthcare services from 2008-2011 across reasons of migration and years of migration**



## Tables

**Table 1. Descriptive statistics of the study population**

Variables	Ethnic Norwegians (N=3,331,595; 94%)	Immigrants (N=200,592; 6%)
	N (%)	N (%)
Gender		
Male	1,700,080 (51)	107,381 (54)
Female	1,631,515 (49)	93,211 (46)
Age groups (years)		
0-9	531,258 (16)	33,322 (16)
10-19	572,937 (17)	29,597 (15)
20-29	491,080 (15)	41,475 (21)
30-39	581,451 (17)	44,140 (22)
40-49	595,769 (18)	34,045 (17)
50-59	559,100 (17)	18,013 (9)
Reasons of migration+		
Ethnic Norwegian	3,331,595 (100)	-
Labour	-	18,288 (18)
Family re-union	-	42,740 (43)
Refugee	-	39,110 (39)
Years of migration+		
1990-1995	-	23,294 (23)
1996-2000	-	21,547 (21)
2001-2004	-	24,552 (25)
2005-2007	-	30,745 (31)
Use of specialist mental healthcare (2008-2011)		
Once	123,211 (4)	6,965 (3)
Twice	81,017 (2)	4,104 (2)
Three times	45,474 (1)	2,080 (1)
Four times	35,936 (1)	1,464 (0.7)

+Only available for non-Nordic immigrants who came during 1990-2007; did not include 2<sup>nd</sup> generation immigrants, immigrants from Sweden, or immigrants who came before 1990.

**Table 2. Study populations and rates of use of specialist mental healthcare across the countries of origin.**

Variables	Sample population	Use of specialist mental healthcare from 2008 to 2011 (%)				Use of specialist mental healthcare (%)*
	N (%)	One year	Two years	Three years	All four years	
Country of origin						
Norway	3,331,595 (94.32)	3.70	2.43	1.36	1.08	8.58
Sweden	20,998 (0.59)	3.28	1.77	0.77	0.58	7.01
Poland	27,179 (0.77)	1.64	0.81	0.44	0.32	4.72
Bosnia-Herzegovina	13,412 (0.38)	4.49	2.80	1.36	1.04	9.45
Russia	11,544 (0.33)	4.21	2.42	1.20	0.77	8.26
Somalia	20,691 (0.59)	2.50	1.32	0.72	0.62	5.11
Turkey	14,073 (0.40)	4.35	2.71	1.22	0.85	8.86
Sir Lanka	12,432 (0.35)	2.40	1.31	0.72	0.44	5.02
Iraq	21,346 (0.60)	4.98	3.21	1.41	0.90	11.44
Iran	14,179 (0.40)	6.69	4.43	2.59	1.63	14.98
Pakistan	26,801 (0.76)	3.18	1.82	1.06	0.77	6.56
Vietnam	17,937 (0.51)	2.53	1.32	0.65	0.51	4.97

\* Age- and gender-standardized rates of use of specialist mental healthcare from 2008 to 2011 (at least once).

**Table 3. Poisson regression estimates (marginal effects) showing country- and age-specific predicted probabilities for the use of specialist mental healthcare services from 2008-2011.**

Country of origin	Age groups							
	0-9 year		10-19 year		20-39 year		40-59 year	
	$\beta$ (se)	95% CI	$\beta$ (se)	95% CI	$\beta$ (se)	95% CI	$\beta$ (se)	95% CI
Norway	0.145 (0.008)	0.143-0.146	0.269 (0.001)	0.267-0.271	0.187 (0.001)	0.185-0.188	0.115 (0.001)	0.114-0.116
Sweden	0.117 (0.017)	0.084-0.151	0.226 (0.021)	0.182-0.268	0.105 (0.004)***	0.097-0.115	0.109 (0.005)	0.098-0.120
Poland	0.089 (0.010)***	0.068-0.108	0.174 (0.017)***	0.139-0.207	0.049 (0.002)***	0.043-0.054	0.056 (0.004)***	0.048-0.064
Bosnia-Herzegovina	0.079 (0.011)***	0.058-0.101	0.133 (0.012)***	0.110-0.156	0.179 (0.008)	0.163-0.199	0.246 (0.011)***	0.222-0.265
Russia	0.145 (0.013)	0.119-0.172	0.253 (0.017)	0.219-0.286	0.125 (0.007)***	0.111-0.140	0.137 (0.009)*	0.120-0.157
Somalia	0.063 (0.005)***	0.053-0.072	0.124 (0.008)***	0.107-0.141	0.112 (0.005)***	0.101-0.123	0.101 (0.009)***	0.081-0.120
Turkey	0.101 (0.009)***	0.082-0.119	0.159 (0.012)***	0.135-0.141	0.204 (0.009)	0.188-0.221	0.163 (0.021)***	0.142-0.184
Sri Lanka	0.049 (0.006)***	0.037-0.061	0.126 (0.012)***	0.102-0.150	0.093 (0.008)***	0.078-0.108	0.098 (0.012)*	0.083-0.114
Iraq	0.086 (0.006)***	0.074-0.098	0.199 (0.010)***	0.180-0.219	0.215 (0.007)**	0.201-0.230	0.300 (0.014)***	0.271-0.323
Iran	0.174 (0.015)*	0.144-0.204	0.307 (0.017)*	0.272-0.342	0.302 (0.012)***	0.278-0.321	0.345 (0.017)***	0.321-0.369
Pakistan	0.083 (0.006)***	0.071-0.096	0.122 (0.007)***	0.108-0.137	0.167 (0.006)***	0.155-0.172	0.108 (0.015)	0.095-0.120
Vietnam	0.076 (0.007)***	0.061-0.090	0.113 (0.009)***	0.096-0.130	0.091 (0.006)***	0.080-0.101	0.086 (0.009)***	0.073-0.098

Statistically significance values showing differences between Norwegian (a reference group) and immigrants: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

$\beta$  (se) = predicted probabilities and robust standard error (in parenthesis) and are adjusted to gender. CI = confidence interval.

